DEPARTMENT OF THE ARMY
Omaha District, Corps of Engineers
106 South 15th Street
Omaha, Nebraska 68102-1618

:NOTICE: Failure to acknowledge : :all amendments may cause rejec- : :tion of the offer. See FAR : :52.215-1 of Section 00100 :	Solicitation No. W9128F 04 R 0024 Date of Issue: 08 JUN 2004 Date of Receiving Proposals: 08 JUL 2004

Amendment No. 0001
25 June 2004

SUBJECT: Amendment No. 0001 to specifications and drawings for Construction of B-1B WEAPONS SYSTEMS TRAINER, FXBM 02-3002, ELLSWORTH AFB, SOUTH DAKOTA.
Solicitation No. W9128F 04 R 0024.

TO: Prospective Offerors and Others Concerned

1. The specifications and drawings for subject project are hereby modified as follows (revise all specification indices, attachment lists, and drawing indices accordingly).

a. Specifications. (Descriptive Changes.)

(1) Section 03300, Page 14, Paragraph 2.1.1, Portland Cement, delete first sentence in its entirety and substitute:

"ASTM C 150, Type I/II low alkali or Type II low alkali including false set requirements."

(2) Section 06200A, Page 4, following pargraph 2.2, add:

"2.3 GROMMETS
Grommets shall be 2-piece circular plastic with cabling slotted cap, 3-inch diameter. Color and style as indicated in Section 09915 COLOR SCHEDULE."

(3) Section 08800, Page 4, Paragraph 1.2, for each of following submittal items, add "; G-AE" after the submittal item:

(a) SD-02 Shop Drawings, submittal item "Installation",

(b) SD-03 Product Data, submittal items "Insulating Glass" and "Glazing Accessories".

(c) SD-04 Samples, submittal item "Insulating Glass".

(4) Section 08900, Page 6, Paragraph 1.3, for each of following submittal items, add "; G-AE" after the submittal item:

(a) SD-02 Shop Drawings and SD-03 Product Data, submittal items "Glazed curtain wall system".

(b)SD-05 Design Data, submittal item “Calculations”.

(5) Section 09915, Page 6.

(a) Delete paragraph 2.2.4.11, in its entirety and substitute:

“2.2.4.11 Electro-Static Conductive Tile

ESC-1: Forbo, Style ESD, Pattern: SD150244, Color Leventina”

(b) Following paragraph 2.2.4.13, add:

"2.2.4.14 Grommets

Doug Mockett & Co. Inc., XG "Flip-Top" Series, 3 inch Hole, Color: Black

2.2.4.15 Fluid Applied Flooring

Neogard, Color: Allied Gray”.

(6) Section 10100A, Page 4, paragraph 2.4 PROJECTION SCREEN, delete last sentence reading “The size of all screens ... on drawings” and substitute

“Typical screen size to be 8 feet wide by 8 feet high in locations shown on drawings. Screen located in Room 225 to be 12 feet wide by 9 feet high.”

(7) **Section 15181A.**

(a) **Page 12**, delete paragraph 2.5.1.4 “Grooved Mechanical Connections” in its entirety.

(b) **Page 13**, delete paragraph 2.6.1.1 “Grooved Mechanical Connections” in its entirety.

(c) **Page 15**, delete paragraph 2.7.7 “Calibrated Balancing Valve” in its entirety, and substitute:

“2.7.7 Calibrated Manual Balancing Valve

Valve shall be calibrated so that flow can be determined when the temperature and pressure differential across valve is known. The valve shall be bi-directional and can be installed in horizontal and vertical planes. The valve shall have the capability to be manually set in the field. The desired flow rate, or gpm, shall be set by slowly adjusting the supplied ball valve until the differential pressure reading across the selected modified venturi reaches the desired gpm. The valve shall have integral pointer which registers the degree of valve opening and a lockable memory stop. Valve shall be constructed with internal seals to prevent leakage and shall be supplied with performed insulation. Valve bodies shall be provided with tapped openings and pipe extensions with positive shutoff valves outside of pipe insulation. The pipe extensions shall be provided with quick connecting hose fittings for a portable meter to measure

the pressure differential. One portable differential meter shall be complete with hose, vent integral metering connection, and carrying case as recommended by the valve manufacturer."

(d) **Page 15**, delete Paragraph 2.7.9 "Temperature Mixing Valve" and 2.7.10 "Pressure Reducing Valve" in their entirety, and substitute:

"2.7.9 Thermostatic Mixing Valve

Valve shall be ASSE 1016 Certified for water service. Valve shall include separate check valves on hot and cold inlets, brass or bronze body, brass and stainless steel components, vandal resistant handle, temperature indication dial and angle stop shut-off valves. Field provided accessories shall include dial thermometer and tempered water shut-off valve. Capacity shall be as specified on drawings.

2.7.10 Emergency Fixture Thermostatic Mixing Valve

Valve shall be ASSE 1016 Certified for water service. Valve shall compensate for supply line temperature and pressure changes, change outlet flow to cold upon thermostat failure, and be provided with tamper resistant control adjustment. Valve shall include separate check valves on hot and cold inlets, brass or bronze body, brass and stainless steel components, temperature indication dial and angle stop shut-off valves. Field provided accessories shall include dial thermometer and tempered water shut-off valve. Capacity shall be as specified on drawings."

(e) **Page 16**, following paragraph 2.7.14, add:

"2.7.15 Automatic Balancing Flow Control Valve

Pressure and temperature ports shall be provided for flow verification. The valve shall have the capability to be installed in horizontal and vertical planes. The valve shall have an internal cartridge pre-set to a specific flow rate as scheduled. This gpm shall not be field adjustable, but the valve shall have the capability to exchange for a different pre-set replacement cartridge. Valve shall be constructed with internal seals to prevent leakage and shall be supplied with performed insulation. The valve body shall house a stainless steel spring-loaded flow control cartridge that maintains the desired flow rate. The valve shall be shipped with a standard body identification tag including the following information: model number, gpm, spring range and location information. Each body is identified with a flow direction arrow. Valve bodies shall be provided with tapped openings and pipe extensions with positive shutoff valves outside of pipe insulation. The pipe extensions shall be provided with quick connecting hose fittings for a portable meter to measure the pressure differential. One portable differential meter shall be complete with hose, vent integral metering connection, and carrying case as recommended by the valve manufacturer."

(f) **Page 19**, delete paragraph 2.11 "AIR SEPARATOR TANKS" in its entirety, and substitute:

"2.11 COMBINATION AIR SEPARATOR AND DIRT SEPARATOR

Separator tank shall be designed such that as the fluid enters the tank, the velocity is decreased creating a low pressure area. 100% of the entrained air and 99% of the dissolved air shall be released from the fluid as it collects on a internal coalescing medium. As the air bubbles coalesce, they shall rise to the top of the separator where the air is released from the tank via an automatic air vent. Also within this low pressure area, sediment down to 5 microns shall be removed for the fluid and collect at the bottom of the separator. The tank shall be provided with a blow-down connection. Tank shall be steel, constructed, tested, and stamped in accordance with ASME BPVC Sec VIII for working pressure of 125 psig. Tank shall have inlets and outlets threaded for 2 inches and smaller and flanged for sizes 2 ½ inches and larger."

(g) **Page 22**, delete paragraph 3.1.3.4 "Grooved Mechanical Connections" in its entirety.

(h) **Page 23**, paragraph 3.1.4 "Valves", line 3, after "... isolating, or sectionalizing purpose.", insert:

"Butterfly valves shall not be used as an isolation or shut-off valve."

(8) **Section 15400A**.

(a) **Page 30**, following paragraph 2.13, add:

"2.14 REVERSE OSMOSIS WATER PURIFIER

Unit shall be provided with Exchange Service Carbon Filter, Reverse Osmosis Unit, Storage Tank, Ultraviolet Disinfection Unit, and Submicron Final Filtration. All items except Storage Tank shall be skid mounted on a painted mild steel framework, system shall be pre-wired, pre-plumbed and factory tested prior to shipment. Construct softener and deionizer tanks in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, provide stamp and certification. Fiberglass exchange tanks are exempt from ASME requirements. RO pressure vessels are exempt from ASME requirements. Provide electrical components, which have been listed and labeled by UL. Assembled control panels shall be UL approved. Top mounted control valves are exempt from UL requirements. Provide electrical controls and enclosures conforming to applicable standards of NEMA for environment where water conditioners are indicated. Provide mineral products acceptable under state and local public health control regulations. Provide limited product warranty for water conditioners covering the following: Attrition loss of mineral not to exceed 3 percent per year for first 3 years, under actual operating conditions, mineral shall not be washed out of system during service run or back washing period, Turbidity and color of effluent, because of passing through the water conditioners shall not be greater than incoming water, Under drain system, gravel, and mineral shall not become fouled, either with turbidity or by dirt, rust, or scale from the water conditioning system, while the system is operating as noted in manufacturer's operating instructions, Water conditioning equipment

shall be warranted against failure due to faulty workmanship, materials, or corrosion for a period of one year. Faulty equipment and materials shall be replaced with no cost to the owner.

2.14.1 Exchange Service Carbon Filter

Provide factory-assembled, multiple, exchange service carbon filter units. Pressure vessels shall be fiber reinforced plastic. All hoses, sampling valve and chlorine test kit will be provided. Carbon shall be 12 X 40 mesh with an Iodine number of no less than 1,000 for maximum chlorine removal. Ash content shall not exceed 9%. Activated carbon must comply with AWWA Standard B604. Empty bed contact time shall be not less than 6 minutes for removal of Free Chlorine. Where Total Chlorine may be of concern, catalytic carbon with a maximum peroxide number of 14 is required. Exchange tanks as required by microbiological growth, or when chlorine break-through is detected. Provide Hach Total Coliform/TAB paddle test.

2.14.2 Reverse Osmosis Unit

RO system shall require 30 PSIG minimum inlet water pressure. The inlet water temperature range is 34° to 100°. The reverse osmosis unit shall reduce the dissolved mineral content of the water by 95 to 99%. Reverse osmosis elements shall be the thin film membrane composite type. Reverse osmosis unit shall be rated to produce 375 gpd at 77 degrees F. The unit will be skid mounted, pre-wired and pre-piped. Major sub-assemblies include a painted, welded steel skid frame, centrifugal pump and motor starter, automatic controller, monitoring equipment, and RO elements with connecting piping, valves and components. RO membrane housings shall be constructed of stainless steel or fiberglass with anti-telescoping end closures. PVC membrane housings are not acceptable. High pressure piping shall be constructed of stainless steel piping or high pressure tubing suitable for this application. Low pressure piping shall be schedule 80 PVC or Polyethylene tubing. The RO skid shall include 5 micron cartridge style pre-filters and a polypropylene housing. Flow rate shall not exceed 4 gpm / ten inch equivalent. Filter shall include glycerin filled inlet/outlet pressure gauges, inlet/outlet isolation valves, and pressure relief valve for ease of cartridge replacement. The RO flux rate shall be within a range of 14-18.5 GFD. RO projections including effluent water quality data, pumping pressure, permeate and concentrate flow rates shall be provided with the submittals.

The equipment will include all mechanical, hydraulic and electrical controls for a complete, self-contained unit. A normally-closed brass body solenoid valve shall be mounted on the inlet to shut off the water supply when the unit is not operating. The unit will be equipped with two brass needle-type throttling valves, one throttling valve on the discharge side of the pump for regulating the operating pressure of the unit, the other in the waste line for regulating the waste flow rate.

The RO process controls shall include each of the following features: low feedwater pressure shut-off and high/low tank level switches to regulate the storage tank water level, also include meter to measure product conductivity. Configure the controls to receive a discrete contact input from the storage tank’s liquid level switches to operate

the RO pump. Alarms shall sound locally for the following conditions: Pump Fault, Low Water Level or High Water Level. Equip the control package with a hardwire terminal strip that will enable it to signal the building automation system of a general system trouble alarm. All control panels shall be UL approved

Operation of the unit will be controlled by a hand-off-auto switch and a disconnect switch, both located on the front of the enclosure. The enclosure shall include a light to indicate when electrical power is on. The three-position switch will permit operation of the unit on a fully automatic basis, or alternately allow operation even though the storage tank is full so that equipment may be serviced.

2.14.3 Product Storage Tank

Premium weight high density polyethylene, one piece seamless storage tank, flat bottom and dome top and shall include all fittings and vent filter. Tank drain shall be via outlet piping. See Schedule on the drawings for capacities and size. Provide tank level switches at the storage tank. The switches shall be 316 stainless steel which will perform the following functions: Cycle the R.O. unit on and off to control the tank level, make an alarm contact at high product water level, shut the distribution pump off and alarm at low-low water level. Provide pressure retaining valve on loop return inlet of storage tank to maintain water pressure in recirculation loop.

2.14.4 Circulation Pump

Centrifugal pump of stainless steel construction with stainless steel impeller and mechanical seals with a check valve on the pump discharge line. The pump will run continuously to provide flow in the distribution system. The pump will maintain velocities of 4-7 fps in the recirculation loop. See schedule on drawings for capacities and sizes.

2.14.5 Ultraviolet Sterilizer

Provide an ultraviolet sterilizer. See Schedule on the drawings for capacity and size. Unit sterilizing chamber shall be 316 stainless steel with housing being 304 stainless steel. Unit shall be equipped with a probe to monitor the relative U.V. intensity passing through the water. Only germicidal U.V. Unit shall provide greater than 30,000 micro watt seconds per centimeter squared at 254nm for effective bacterial kill. Lamp life of the unit shall be 9,000 hours of operation based on coefficient absorption of .06. UV shall be provided with a high temperature shutdown device. UV inlet and outlet shall be fitted with UV light traps to prevent degradation of piping and environmental emissions of UV radiation.

2.14.6 Membrane Filters

Membrane filters remove cell particles referred to as endotoxins following UV disinfection. Provide stainless steel filter housings and 0.2 micron membrane filter cartridges with 222 ends. See Schedule on the drawing for flow rates. The flow rate through the membrane filters shall not exceed 2.5 gpm per ten inch equivalent.

2.14.7 Conditioned Water; Pipe, Fittings and Valves

Piping upstream of the RO shall be schedule 80 PVC. Fittings ASTM D 2467 type with PVC true union ball valves."

(b) **Page 44**, following Paragraph 3.12.1.1 Gas, add:

"3.13 REVERSE OSMOSIS WATER PURIFIER INSTALLATION

Install water conditioners in accordance with equipment manufacturer's written instructions and with recognized industry practices, to ensure that water conditioners comply with requirements and serve intended purposes. Provide access and service space around and over the water conditioners, not less than that recommended by manufacturer. Place water conditioners on 4-inch high concrete slab. Plumb and level units. Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of division 16 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer. Provide shut-off valves and unions or flanges on water connections. Pipe drain to nearest floor drain.

3.13.1 Adjusting and Cleaning

Start-up, test and adjust water conditioners in presence of manufacturer's authorized representative. Operate units through all cycles. Adjust unit to maintain required flow rates and effluent water quality. Clean factory-finishes surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

3.13.2 Closeout Procedures

Provide services of manufacturer's technical representative for one 8-hour day to instruct Owner's personnel in operation and maintenance of water conditioners. Schedule training with Owner; provide at least 14 day notice to government of training date. Complete instructions covering installation and operation of the humidification water system shall be provided in booklet form. All component parts must be easily identified, in exposed views, by an individual part number."

(9) Section 15569A, Page 32, paragraph 3.2.10 Valves, to the end of paragraph, add:

"Butterfly valves shall not be used as an isolation or shut-off valve."

(10) Section 15895, Page 30, delete Paragraph 2.12.1 "Rotary Wheel" in its entirety, and substitute:

"2.12.1 Rotary Energy Wheel

Unit shall be a factory fabricated and tested assembly for air-to-air energy recovery by transfer of sensible and latent heat from the exhaust air to supply air stream. Device performance shall be in accordance with ASHRAE 84. Unit shall deliver an energy transfer effectiveness as scheduled. A purging sector shall be provided with

the energy wheel. The heat recovery unit shall be constructed from a rigid tubular steel welded frame. The frame shall be reinforced to prevent deflection of the rotor from static pressure drops to less then 0.03". The rotor shall be assembled from alternated layers of flat and corrugated thin sheet aluminum. The rotor shall pass dry particles up to 900 microns freely without clogging. Moisture shall be transferred between the airstreams in the vapor stage through the hygroscopic rotor. Rotor shall be mounted on permanently-lubricated and sealed spherical ball bearings. Exchanger shall be sealed with brush seals between airstreams and around the perimeter of the rotor. Rotor shall be provided with electronic speed control for 4 to 20ma control. Energy wheel shall have factory controls, frost protection, and dampers for economizer bypass."

(11) Section 16415A, Page 44, paragraph 3.6.1 Single and Duplex, 15 or 20-ampere, 125 Volt, line 2, after "parallel slots" insert:

"Gray in color".

(12) Section 16710A, Page 7, paragraph 2.2.2.1 Telecommunications Outlets, delete last sentence reading 'Secure "red" outlet ... red faceplate.' and substitute:

"Secure "red" data jacket shall be red in color."

b. Specifications (New and/or Revised and Reissued). Delete and substitute or add specification pages or sections as noted below. The substituted pages or sections are revised and reissued with this amendment.

Pages or Sections Deleted	Pages or Sections Substituted or Added
Section 07416A	Section 07416A
Section 08350	Section 08350

c. Drawings (Not Reissued). The following sheets of drawing code AF 171-10-01 are revised as indicated below with latest revision date of 23 June 2004. These drawings are not reissued with this amendment.

(1) Sheet C5.01, add the following note to the sheet:

"NOTE: NATIVE SOILS WITHIN 5 FEET OF THE BOTTOM OF FLOOR SLAB AND 5 FEET BELOW THE BOTTOM OF FONTS SHALL BE REMOVED UNLESS NOTED OTHERWISE. REPLACE WITH LIMESTONE LEDGE ROCK BASE COURSE COMPLYING WITH SECTION 882 OF THE SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION STANDARDS SPECIFICATIONS FOR ROADS AND BRIDGES. SEE 9/C9.01."

(2) Sheet A1.01, GENERAL NOTES, following note 11, add:

"12. BRICK EXPANSION JOINT LOCATIONS SHOWN ON SHEETS A4.01, A4.02, A5.01 AND A5.02."

(3) Sheet A1.02, GENERAL NOTES, following note 11, add:

"12. BRICK EXPANSION JOINT LOCATIONS SHOWN ON SHEETS A4.01, A4.02, A5.01 AND A5.02."

(4) A5.09, STC RATED WALL DETAIL 13/A5.09, delete note reading "CONTINUOUS ACOUSTICAL SEALANT TAPE" and substitute:

"THREE BEADS OF CONTINUOUS ACOUSTICAL SEALANT".

(5) Sheet A6.01.

(a) DOOR SCHEDULE, Door Nos. 150D and 151D, under REMARKS column, add: "12"

(b) DOOR SCHEDULE REMARKS notes, following note 11, add:

"12. CLEAR OPENING TO BE 16'-8" WIDE MINIMUM."

(6) Sheet S1.01, GENERAL STRUCTURAL NOTES D. FOOTINGS, delete notes 2 and 3 in their entirety and substitute:

"2. THE NATURAL SOIL BELOW THE BUILDING SHALL BE REMOVED A MIN OF FIVE FEET BELOW BOTTOM OF FOOTING OR SLAB AND REPLACED WITH COMPACTED GRANULAR FILL. SEE DETAIL 9/C9.01.

3. IF AFTER OVER-EXCAVATION AND COMPACTION OF GRANULAR FILL, THE SOIL AT THE FOOTING ELEVATIONS SHOWN IS OF QUESTIONABLE BEARING VALUE, NOTIFY THE CONTRACTING OFFICER'S OFFICE IMMEDIATELY. "

(7) Sheet S2.01, FOUNDATION PLAN NOTES, following note 11, add:

"12. FOR OVER-EXCAVATION AND BACKFILLING AT FOUNDATION AND SLABS SEE DETAIL 9/C9.01."

(8) Sheet M2.05, KEY NOTES, delete note 5 in its entirety and substitute:

"#5 PROVIDE 24X16 LOCKABLE ACCESS PANEL ON THE SIDE OF 44X20 RETURN AIR DUCT AT THIS LOCATION.

#6 PROVIDE 24X18 LOCKABLE ACCESS PANEL ON THE SIDE OF 24X22 EXHAUST AIR DUCT AT THIS LOCATION."

(9) Sheet M3.06.

(a) AIR HANDLING UNIT SCHEDULE.

i) AHU-1, under SUPPLY FAN EXT. S.P., delete "2.5" and substitute "3.0"; under SUPPLY FAN-TOTAL S.P., delete "7.0" and substitute "7.5"; and under FILTER, delete "FB-1" and substitute "FB-1 AND FB-11".

ii) AHU-2, under SUPPLY FAN EXT. S.P., delete "3.5" and substitute "2.5"; under SUPPLY FAN-TOTAL S.P., delete "4.9" and substitute "3.9"; and under SUPPLY FAN-MOTOR DATA (HP), delete "30" and substitute "25".

(b) AIR COOLED WATER CHILLER SCHEDULE, Units CLR-1 and CLR-2.

i) Under the heading NOTES, add numbers “4 & 5”.
ii) NOTES below schedule, following note 4, add:

“5. PROVIDE CRANK CASE HEATER, LOW AMBIENT KIT, HEAT TAPE AND INSULATED BLANKET ON THE COMPRESSOR (FIELD INSTALLED), STRIP HEATER ON THE EVAPORATOR BARREL, HEAT TAPE IN THE CONTROL PANEL, AND A FULL PERIMETER LOUVER PACKAGE FOR CHILLER OPERATION DURING THE WINTER. ALL HEATING COMPONENTS SHALL BE PROVIDED WITH ADJUSTABLE THERMOSTATS FROM 0-32 DEGREES F.”

(c) EXHAUST FAN SCHEDULE, Unit EF-1, Under the heading NOTES, add number “3”.

(10) Sheet E2.01.

(a) FIRST LEVEL FLOOR PLAN, Room 112, show a Keynote “23” in this room and show information include Keynote 23.

(b) FIRST LEVEL FLOOR PLAN, revise floor plan to provide (1) 20A/1P circuit breaker and (1) 30A/1P circuit breaker in panelboard L13 (circuits 54,56,58,60) at each chiller for heating.

(c) KEYNOTES, following note 22, add:

“23. PROVIDE RECEPTACLE ABOVE COUNTER IN ROOM 112 FOR MICROWAVE. MOUNT RECEPTACLE AT 70 INCHES A.F.F. CONNECT TO PANEL L11, CIRCUIT 32. COORDINATE EXACT LOCATION WITH ARCHITECTURAL 1/A4.03 AND CABINET INSTALLER.”

(11) Drawing Sheet E2.02, 2ND LEVEL FLOOR PLAN, ROOM 257, revise drawing to show the following information:

AHU-2 supply has been reduced from 30HP to 25HP. Indicate 80A/3P circuit breaker in panel HP1 (circuits 7,9,11) as a 70A/3P circuit breaker with a load of 9.4KVA per phase. Provide 60A/3P, 480V, 3PH, Fusible NEMA 1, disconnect switch with 50A RK5 fuses. Provide 3/4" conduit with 3#8 AWG and 1#10 AWG ground to panelboard HP1 from AHU-2 supply.

(12) Sheet E2.03, ENLARGED FIRST LEVEL FLOOR PLAN, ROOM 101, revise drawing to show the following:

(a) Boilers #1 and #2 voltages changed from (2 HP) 480V/3PH to (1 HP) 120V/1PH. Delete circuits 20,22,24 (30A/3P circuit breaker) and 26,28,30 (30A/3P circuit breaker) from panel HP1 and indicate as spare 20A/1P circuit breakers. Delete feeders from Boilers #1 and #2 to panelboard HP1.

(b) Add 20A/1P circuit breaker to panel L11 circuit 68 for Boiler #1. Provide manual motor starter. Provide 1/2" conduit with 3#12 AWG and 1#12 AWG ground to panelboard HP1 from Boiler #1.

(c) Add 20A/1P circuit breaker to panel L11 circuit 70 for Boiler #2. Provide manual motor starter. Provide 1/2" conduit with 3#12 AWG and 1#12 AWG ground to panelboard HP1 from Boiler #2.

(13) Sheet E8.02, Panelboard HP1, Circuits 20, 22, 24, 26, 28 and 30, revise BKR information to read "--" and revise NOTES information to read "SPACE".

(14) Sheet E8.03.

(a) Panelboard L11.

i) Circuits 68 and 70, under LOAD KVA, MISC, insert "1.92", under NOTES, delete "SPARE" and substitute "B-1" for Circuit 68 and "B-2" for Circuit 70.

ii) Circuit 32, under LOAD KVA, MISC, delete "1" and substitute "1.1".

(b) Panelboard L13.

i) Circuits 56 and 60, under BKR column, delete "20/1" and substitute "30/1"; Also, under NOTES column, delete "SPARE" and substitute "CHILLER HTR".

ii) Circuits 54 and 58, under NOTES column, delete "SPARE" and substitute "CHILLER HTR".

d. Drawings (Reissued). The following sheets of drawing code AF 171-10-01 are revised with latest revision date of 23 June 2004, and reissued with this amendment.

(1) Sheet G2.02.

(2) Sheets A2.02, A3.01, A4.01, A4.02, A5.01, A5.02, A8.01, A8.02, and A8.03

(3) Sheets M1.01, M1.02, M1.03, M1.04, M1.05, M2.03, M2.04, M2.06 M3.02, M3.03, M3.07, M3.08, and M4.05.

e. Drawings (New). The following new sheet of drawing code AF 171-10-01 dated 23 June 2004 is hereby added to the contract drawings and is issued with this amendment.

(1) Sheet M3.09.

2. This amendment is a part of the proposing papers and its receipt shall be acknowledged on the Standard Form 1442. All other conditions and requirements of the specifications remain unchanged. If the proposals have been mailed prior to receiving this amendment, you will notify the office where proposals are received, in the specified manner, immediately of its receipt and of any changes in your proposal occasioned thereby.

a. Hand-Carried Proposals shall be delivered to the U.S. Army Corps of Engineers, Omaha District, Contracting Division (Room 301), 106 South 15th Street, Omaha, Nebraska 68102-1618.

b. Mailed Proposals shall be addressed as noted in Item 8 on Page 00010-1 of Standard Form 1442.

3. Offers will be received until 2:00 p.m., local time at place of receiving proposals, 08 JUL 2004.

Attachments:

Spec Pages or Sections listed in 1.b. above
Dwgs. listed in 1.d. and 1.e. above

U.S. Army Engineer District, Omaha
Corps of Engineers
106 South 15th Street
Omaha, Nebraska 68102-1618

25 June 2004
DRL/4547

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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07416A

STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

11/01

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SECTION 07416A

STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
11/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG-973	(1996) Cold-Formed Steel Design Manual

ASTM INTERNATIONAL (ASTM)

ASTM A 366	(1972) Steel, Carbon, Cold-Rolled Sheet, Commercial Quality
ASTM A 653/A 653M	(2004a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 792/A 792M	(2002) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM B 117	(1997) Operating Salt Spray (Fog) Apparatus
ASTM C 1177/C 1177M	(2001) Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C 1289	(2002) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM C 518	(1998) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 665	(2001e1) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM D 1308	(2002) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D 1654	(1992; R 2000) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D 1970	(2001) Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
ASTM D 2244	(2002) Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D 2247	(2002) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D 2582	(2003) Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
ASTM D 2794	(1993; R 1999el) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(2002) Measuring Adhesion by Tape Test
ASTM D 3776	(1996) Mass Per Unit Area (Weight) of Fabric
ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 4214	(1998) Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D 522	(1993a; R 2001) Mandrel Bend Test of Attached Organic Coatings
ASTM D 523	(1989; R 1999) Specular Gloss
ASTM D 610	(1995) Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D 714	(2002) Evaluating Degree of Blistering of Paints
ASTM D 822	(2001) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
ASTM D 882	(2002) Tensile Properties of Thin Plastic Sheeting
ASTM D 903	(1998) Peel or Stripping Strength of Adhesive Bonds
ASTM D 968	(1993; R 2001) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM E 1592	(2001) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

ASTM E 84	(2001) Surface Burning Characteristics of Building Materials
ASTM E 96	(2000e1) Water Vapor Transmission of Materials

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2002) Minimum Design Loads for Buildings and Other Structures

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

APA E445R	(1980; Rev Jan 1996) Performance Standards and Policies for Structural-Use Panels

U.S. DEPARTMENT OF COMMERCE (DOC)

PS1	(1995) Construction and Industrial Plywood (APA V995)
PS2	(1992) Wood-Based Structural-Use Panels (APA 5350)

1.2 GENERAL REQUIREMENTS

The Contractor shall furnish a commercially available roofing system which satisfies all requirements contained herein and has been verified by load testing and independent design analysis to meet the specified design requirements.

1.2.1 Structural Standing Seam Metal Roof (SSSMR) System

The SSSMR system covered under this specification shall include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, sheathing underlayment, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, eaves, ridge, or other roof system flashings installed and specified within this contract to provide a weathertight roof system. Panels shall be continuous lengths with no joints or transverse seams, except where indicated or specified. Panel profiles shall be of the type with a locked seam produced with a field operated roll-forming tool. Finished roof system shall have smooth, uniform appearance with minimal oil-canning. All metal panels must be factory pre-manufactured and engineered except panels in excess of shippable length. Panels in excess of shippable length shall be formed on site using heavy duty factory type rollformers of a type that gradually produce a finished panel profile using at least twelve forming stations. Tooling shall be maintained clean and in good working condition. Tooling repairs made in the field by means of welding, sawing, grinding, or the like are unacceptable. Trained and experienced technicians shall operate site rollforming equipment. Field formed panel profiles and characteristics shall be identical to factory formed panel profiles. Seam caps shall be pre-manufactured and have sealant applied in the factory. One manufacturer shall provide all components of the SSSMRS except that where a product necessary for a complete installation is not available

directly from the "primary" manufacturer it may be supplied by another manufacturer with the primary manufacturer's written approval. The snow guard system shall be completely compatible with the system provided and have no deleterious effects on performance or warranty.

1.2.2 Manufacturer

The SSSMR system shall be the product of a manufacturer who has been in the practice of manufacturing and designing SSSMR systems for a period of not less than 10 years and has been involved in at least five projects similar in size and complexity to this project. The manufacturer shall have a representative on site for 20% of the actual installation process.

1.2.3 Installer

The installer shall be certified by the SSSMR system manufacturer to have experience in installing at least three projects that are of comparable size, scope and complexity as this project for the particular roof system furnished. The installer may be either employed by the manufacturer or be an independent installer. Installer qualifications shall be certified in writing by the manufacturer as an approved installer of the system being supplied. In addition, the supervising staff person for the installer shall also be specifically certified by the manufacturer for the system being supplied with a manufacturers description of the type of supervision required.

1.2.4 Moisture Vapor Control System

The moisture vapor control system for the roofing assembly using an SSSMR system shall be of the materials and installation indicated herein. The moisture vapor control system is critical to the success of the SSSMR system and shall receive appropriate attention throughout the installation process.

1.2.5 CONSTRUCTION OBSERVATION AND TESTING

The Contractor will retain the services of an independent agency for roof and moisture vapor control system testing and construction observation. Notify Contractor's construction observer whenever work is to be done in sufficient time to arrange construction observation. Work shall include:

1. Full-time construction observation the first two weeks of roofing construction.
2. Periodic construction observation consisting of one two-day visit per week, including travel, thereafter for the duration of the roofing work.
3. One pre-construction meeting on-site.
4. One punch-list development site visit.

1.3 DESIGN REQUIREMENTS

The design of the SSSMR system shall be provided by the Contractor as a complete system. Members and connections not indicated on the drawings shall be designed by the Contractor. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer.

1.3.1 Design Criteria

Design criteria shall be in accordance with ASCE 7.

1.3.2 Dead Loads

The dead load shall be the weight of the SSSMR system. Collateral loads such as sprinklers, mechanical and electrical systems, and ceilings shall not be attached to the panels.

1.3.3 Live Loads

1.3.3.1 Concentrated Loads

The panels and anchor clips shall be capable of supporting a 300 pound concentrated load. The concentrated load shall be applied at the panel midspan and will be resisted by a single standing seam metal roof panel assumed to be acting as a beam. The undeformed shape of the panel shall be used to determine the section properties.

1.3.3.2 Uniform Loads

The panels and concealed anchor clips shall be capable of supporting a minimum uniform gravity load of 30 psf and also resist loads shown on drawings.

1.3.4 Roof Snow Loads

The design roof snow loads shall be as shown on the contract drawings.

1.3.5 Wind Loads

The design wind uplift pressure for each roof system shall be as shown on the contract drawings. The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when figuring fastener design loads.

a. Single fastener in each connection.....3.0

b. Two or more fasteners in each connection...2.25

1.3.6 Thermal Loads

Roof panels shall be free to move in response to the expansion and contraction forces resulting from a total temperature range of 220 degrees F during the life of the structure.

1.3.7 Framing Members Supporting the SSSMR System

Any additions/revisions to framing members supporting the SSSMR system to accommodate the manufacturer/fabricator's design shall be the Contractor's responsibility and shall be submitted for review and approval. New or revised framing members and their connections shall be designed in accordance with AISI SG-973 Cold-Formed Manual.. Maximum deflection under applied live load, snow, or wind load shall not exceed 1/180 of the span length.

1.3.8 Roof Panels Design

Steel panels SSSMR Type-1, Type-2 and Type 3 shall be designed in accordance with AISI SG-973. The structural section properties used in the design of the panels shall be determined using the unloaded shape of the roof panels. The calculated panel deflection from concentrated loads shall not exceed 1/180 of the span length. The calculated panel deflection under applied live load, snow, or wind load shall not exceed 1/180 times the span length. Deflections shall be based on panels being continuous across three or more supports. Deflection shall be calculated and measured along the major ribs of the panels.

1.3.9 Accessories and Their Fasteners

Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the roof panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces. There shall be a minimum of two fasteners per clip. Single fasteners with a minimum diameter of 3/8 inch will be allowed when the supporting structural members are prepunched or predrilled.

1.4 PERFORMANCE REQUIREMENTS

Each SSSMR shall be tested for wind uplift resistance in accordance with ASTM E 1592; SSSMR systems previously tested and approved by the Corps of Engineers' STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF SSMRS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE may be acceptable. Two tests shall be performed. Test 1 shall simulate the edge condition with one end having crosswise restraint and other end free of crosswise restraint. The maximum span length for the edge condition shall be 30 inches. Test 2 shall simulate the interior condition with both ends free of crosswise restraint. The maximum span length for the interior condition shall be 5.0 feet. External reinforcement, such as clamps on the ribs, shall not be installed to improve uplift resistance. Bolts through seams shall not be installed.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Structural Standing Seam Metal Roof System; G-AE.

Metal roofing drawings and specifications and erection drawings; shop coating and finishing specifications; and other data as necessary to clearly describe design, materials, sizes, layouts, standing seam configuration, construction details, provisions for thermal movement, line of panel fixity, fastener sizes and spacings, sealants and erection procedures. Drawings shall reflect the intent of the architectural detailing using the manufacturer's proprietary products and fabricated items as required. The SSSMR system shop drawings shall be provided by the metal roofing manufacturer. Show relationships with adjacent and interfacing work.

Moisture Vapor Control System; G-AE

Submit moisture vapor control membrane drawings and specifications and erection drawings; and other data as necessary to clearly describe materials, sheet configuration, construction details, method for sealing of seams and erection procedures. Drawings shall show all the edge conditions, how the membrane shall coordinate with adjacent building features and highlight for the installer any locations requiring extra care in installation. Drawings shall be coordinated with the metal roofing manufacturer.

Submit shop drawing of proposed temporary seal-off to be used at the termination of each day's work to prevent wettting or other damage to the completed work.

SD-03 Product Data

Design Analysis; G-AE.

Design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis shall include a list of the design loads, and complete calculations for the support system (when provided by the Contractor), roofing system and its components; screw pullout test results, and shall indicate how expected thermal movements are accommodated.

Submit design calculations for the snow guard system.

Qualifications

Qualifications of the manufacturer and installer.

SD-04 Samples

Accessories; G-AE.

One sample of each type of flashing, trim, closure, thermal spacer block, cap and similar items. Size shall be sufficient to show construction and configuration.

Roof Panels; G-AE.

One piece of each type to be used, 9 inches long, full width.

Factory Color Finish; G-AE.

Three 3 by 5 inches samples of each type and color.

Fasteners; G-AE.

Two samples of each type to be used, with statement regarding intended use. If so requested, random samples of bolts, nuts, and washers as delivered to the job site shall be taken in the presence of the Contracting Officer and provided to the Contracting Officer for testing to establish compliance with specified requirements.

Insulation; G-AE.

One piece, 12 by 12 inches, of each type and thickness to be used, with a label indicating the rated permeance (if faced) and R-values. The flame spread, and smoke developed rating shall be shown on the label or provided in a letter of certification.

Gaskets and Insulating Compounds

Two samples of each type to be used and descriptive data.

Sealant

One sample, approximately 1 pound, and descriptive data.

Concealed Anchor Clips; G-AE.

Two samples of each type used.

Subpurlins; G-AE.

One piece, 9 inches long.

EPDM Rubber Boots; G-AE.

One piece of each type.

SD-06 Test Reports

Uplift Resistance; G-AE.

The report shall include the following information:

a. Details of the SSSMR system showing the roof panel cross-section with dimensions and thickness.

b. Details of the anchor clip, dimensions, and thickness.

c. Type of fasteners, size, and the number required for each connection.

d. Purlins/subpurlins size and spacing used in the test.

e. Description of the seaming operation including equipment used.

f. Maximum allowable uplift pressures. These pressures are determined from the ultimate load divided by a factor of safety equal to 1.65.

g. Any additional information required to identify the SSSMR system tested.

h. Signature and seal of an independent registered engineer who witnessed the test.

SD-07 Certificates

Structural Standing Seam Metal Roof System

a. Certification that the actual thickness of uncoated sheets used in SSSMRS components including roofing panels, subpurlins, and concealed anchor clips complies with specified requirements.

b. Certification that materials used in the installation are mill certified.

c. Previous certification of SSSMR system tested under the Corps of Engineers' Standard Test Method in lieu of ASTM E 1592 testing.

d. Certification that the sheets to be furnished are produced under a continuing quality control program and that a representative sample consisting of not less than three pieces has been tested and has met the quality standards specified for factory color finish.

e. Certification of installer. Installer certification shall be furnished.

f. Warranty certificate. At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to this section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weathertightness warranty.

1.6 DELIVERY AND STORAGE

Materials shall be delivered to the site in a dry and undamaged condition and stored out of contact with the ground. Materials shall be covered with weathertight coverings and kept dry. Storage conditions shall provide good air circulation and protection from surface staining. Protect components during fabrication and packing from mechanical abuse, stains, discoloration and corrosion. Provide protective interleaving between contact areas of exposed surfaces to prevent abrasion during shipment, storage and handling.

1.7 WARRANTIES

The SSSMR system shall be warranted as outlined below. Any emergency temporary repairs conducted by the owner shall not negate the warranties.

1.7.1 Contractor's Weathertightness Warranty

The SSSMR system shall be warranted by the General and SSSMR Contractors on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The SSSMR system covered under this warranty shall include the entire roofing system including, but not limited to, the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents,; eaves, ridge, or other roof system flashings installed and any other components specified within this contract to

provide a weathertight roof system; and items specified in other sections of these specifications that are part of the SSSMR system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified design loads, water leaks and wind uplift damage shall be repaired as approved by the Contracting Officer. See the attached Contractor's required warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractors shall supplement this warranty with written warranties from the installer and system manufacturer, which shall be submitted along with Contractor's warranty; however, the Contractor s shall be ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in attached WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM, and shall start upon final acceptance of the facility. It is required that the Contractors provide a separate bond in an amount equal to the installed total roofing system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the five year Contractor's warranty period for the entire SSSMR system as outlined above.

1.7.2 Manufacturer's Material Warranties.

The Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, accessories, and trim, fabricated from coil material. These warranties shall be from a single manufacturer for the entire roofing system and shall take into consideration the use of the snow-guard system selected.

a. A manufacturer's 20 year material warranty warranting that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

b. A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change color in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing with an air-drying version of the specified finish or replacing the defective coated material.

c. A roofing system manufacturer's 30 year, non-prorated, system weathertightness warranty.

1.8 COORDINATION MEETING

A coordination meeting shall be held 30 days prior to the first submittal, for mutual understanding of the Structural Standing Seam Metal Roof (SSSMR) System contract requirements. This meeting shall take place at the building site and shall include representatives from the Contractor, the roof system manufacturer, the roofing supplier, the erector, the SSSMR design engineer of record, the independent construction observation and testing agency, and the Contracting Officer. All items required by

paragraph SUBMITTALS shall be discussed, including applicable standard manufacturer shop drawings, and the approval process. The Contractor shall coordinate time and arrangements for the meeting.

PART 2 PRODUCTS

2.1 ROOF PANELS

The structural standing seam metal roofing system panels shall be steel and shall have a factory color finish. Length of sheets shall be sufficient to cover the entire length of any unbroken roof slope for areas shown on drawings or slope lengths that do not exceed 30 feet. When length of run exceeds 30 feet and panel laps are provided, each sheet in the run shall extend over three or more supports. Sheets longer than 100 feet may be furnished if approved by the Contracting Officer. Width of sheets shall provide not more than 24 inches of coverage in place. SSSMR system with roofing panels greater than 12 inches in width shall have standing seams rolled during installation by an electrically driven seaming machine. Height of standing seams shall be not less than 2-3/8 inches for rolled seam. Panel profile shall exhibit distinct mesas, ribs and other stiffening configurations.

2.1.1 Steel Panels

Steel panels shall be aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating. Zinc-aluminum alloy coated panels shall be 0.023 inch thick minimum. Panels shall be within 95 percent of reported tested thickness as noted in wind uplift resistance testing required in paragraph PERFORMANCE REQUIREMENTS. Mill finish panels shall be treated with a passivating chemical to inhibit the formation of oxide corrosion products. Panels that have become wet during shipment and have started to oxidize shall be rejected.

2.2 CONCEALED ANCHOR CLIPS

Concealed anchor clips shall be the same as the tested roofing system. ASTM A 366, hot dipped galvanized in accordance with ASTM A 653/A 653M, G90 coating designation. Clip bases shall have factory punched or drilled holes for attachment. Clips shall be made from multiple pieces with the allowance for the total thermal movement required to take place within the clip. Single piece clips may be acceptable when the manufacturer can substantiate that the system can accommodate the thermal cyclic movement under sustained live or snow loads without panel distortion. Sealant applied in the panel caps must be isolated from the clip. The clip shall hold the panel away from the supporting members a minimum or 3/8 inches. Add field-applied sealant to each clip to provide continuity of the sealant along the seam.

2.3 ACCESSORIES

Flashing, trim, metal closure strips, caps and similar metal accessories shall be the manufacturer's standard products. Exposed metal accessories shall be finished to match the panels furnished. Die cast metal closures shall be installed with double bead tape sealant and fasteners that stitch the panel to a 16 gage preformed backer plate to ensure a positive compression of the tape sealant. The use of a continuous angle butted to the panel ends to form a closure will not be allowed. Panel cap shall receive two beads of sealant that shall be applied independently of the anchor clip. Sealant shall be SIS (Styrene-Isoprene-Styrene) block

copolymer type, thermoplastic rubber adhesive non-fatiguing water barrier.

2.4 FASTENERS

Fasteners for steel roof panels shall be zinc-coated steel, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for structural connections shall provide both tensile and shear ultimate strengths of not less than 750 pounds per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed roof fasteners shall be sealed or have sealed washers on the exterior side of the roof to waterproof the fastener penetration. Washer material shall be compatible with the roofing; have a minimum diameter of 3/8 inch for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. Exposed fasteners for factory color finished panels shall be factory finished to match the color of the panels.

2.4.1 Screws

Screws for attaching anchor devices shall be not less than No. 14. Actual screw pull out test results shall be performed for the actual material gage and yield strength of the structural purlins or subpurlins to which the clip is to be anchored/attached. Other screws shall be as recommended by the manufacturer to meet the strength design requirements of the panels.

2.4.2 Bolts

Bolts shall be not less than 1/4 inch diameter, shouldered or plain shank as required, with locking washers and nuts.

2.4.3 Structural Blind Fasteners

Blind screw-type expandable fasteners shall be not less than 1/4 inch diameter. Blind (pop) rivets shall be not less than 9/32 inch minimum diameter.

2.5 SUBPURLINS

Cold formed supporting structural members/subpurlins shall have a minimum thickness of 0.059 inches and a minimum tensile yield strength of 50000 psi. Hot rolled structural members shall have a minimum thickness of 0.25 inches and a minimum tensile yield strength of 36000 psi. Subpurlins shall be shop painted.

2.6 FACTORY COLOR FINISH

Panels shall have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish shall consist of a baked-on topcoat with an appropriate prime coat. Color shall match the color indicated in Section 09915 COLOR SCHEDULE. The exterior coating shall be a nominal 1 mil thickness consisting of a topcoat of not less than 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 0.2 mil thickness. The interior color finish shall consist of a 0.2 mil thick prime coat. The exterior color finish shall meet the test requirements specified below.

2.6.1 Salt Spray Test

A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 1000 hours in accordance with ASTM B 117, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; ASTM D 610; and a rating of 6, over 21/16 to 1/8 inch failure at scribe, as determined by ASTM D 1654.

2.6.2 Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 1/8 inch diameter mandrel, the coating film shall show no evidence of cracking to the naked eye.

2.6.3 Accelerated Weathering, Chalking Resistance and Color Change

A sample of the sheets shall be tested in accordance with ASTM D 822, for 2000 total hours. The coating shall withstand the weathering test without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating with an adhesion rating less than 4B when tested in accordance with ASTM D 3359, Test Method B, shall be considered as an area indicating loss of adhesion. Following the accelerated weathering test, the coating shall have a chalk rating not less than No. 8 in accordance with ASTM D 4214 test procedures, and the color change shall not exceed 5 CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. For sheets required to have a low gloss finish, the chalk rating shall be not less than No. 6 and the color difference shall be not greater than 7 units.

2.6.4 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 2000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

2.6.5 Impact Resistance

Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 0.500 inch diameter hemispherical head indenter, equal to 1.5 times the metal thickness in mils, expressed in inch-pounds, with no cracking.

2.6.6 Abrasion Resistance Test

When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 50 liters of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.

2.6.7 Specular Gloss

Finished roof surfaces for SSSMR Type 1, Type 2 and Type 3 shall have a specular gloss value of 10 or less at an angle of 85 degrees when measured in accordance with ASTM D 523.

2.6.8 Pollution Resistance

Coating shall show no visual effects when covered spot tested in a 10

percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

2.7 INSULATION

Thermal resistance of insulation shall be not less than the R-values shown on the contract drawings. R-values of polyisocyanuate board insulation shall be determined at a mean temperature of 75 degrees F in accordance with ASTM C 518. Insulation shall be a standard product with the insulation manufacturer, factory marked or identified with insulation manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. Insulation, including facings, shall have a flame spread not in excess of 50 and a smoke developed rating not in excess of 25 when tested in accordance with ASTM E 84. The stated R-value of the insulation shall be certified by an independent Registered Professional Engineer if tests are conducted in the insulation manufacturer's laboratory.

2.7.1 Polyisocyanurate Rigid Board Insulation for Use Above a Roof Deck

Polyisocyanurate insulation shall conform to ASTM C 1289, Type II Class 2, minimum compressive strength of 25 psc, dimensional stability of 2%, 24 hour minimum cure time plus an additional 24 hours per inch. All packages shall have RIC/TIMA label. For polyisocyanurate, the maximum design R-value per 1 inch of insulation used shall be 7.2. Facings shall be non-asphaltic, glass fiber reinforced. Thickness shall not exceed 2 inches for any one layer.

2.7.2 Blanket Insulation

Blanket insulation shall conform to ASTM C 665, Type 1.

2.7.3 Glass Mat Gypsum Roof Board

Glass mat gypsum roof board for use above the deck shall have a flame spread - 0, smoke developed - 0, shall be water resistant and have a compressive strength of 500 psi. Glass mat gypsum roof board shall have a non-asphaltic coating on one side and conform to ASTM C 1177/C 1177M.

2.8 INSULATION RETAINERS

Insulation screw retainers at roof areas waest of Gridline 'D' shall be type, size, and design necessary to adequately hold the insulation and to provide a neat appearance. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation. Insulation retainers east of Gridline 'D' shall be one inch wide, 24 gauge galvanized steel straps at a two foot maximum on center spacing.

2.9 SEALANT

Sealants shall be elastomeric type containing no oil or asphalt. Exposed sealant shall be colored to match the applicable building color and shall cure to a rubberlike consistency. Sealant placed in the roof panel standing seam ribs shall be provided in accordance with the manufacturer's recommendations.

2.10 GASKETS AND INSULATING COMPOUNDS

Gaskets and insulating compounds shall be nonabsorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be nonrunning after drying.

2.11 VAPOR RETARDER

2.11.1 Reinforced Vapor Barrier

Reinforced vapor barrier material shall be a 3-ply laminated sheeting material with 1 mil aluminum core with a layer of multi-axially oriented, high density polyethylene on both sides. A full compatible double-sided asphaltic pressure sensitive mastic seaming tape and polyethyene attachment tape will be provided.

2.11.2 Vapor Barrier Performance Criteria

a. Tensile Strength, ASTM D 882: 42 lb/3000 psi
b. Weight, ASTM D 3776; 70 lb/1000 sf
c. Puncture propoagation Tear, ASTM D 2582: 15 lbs
d. Water Vapor Transmission Rate, ASTM E 96: 0.000 g/100 sq.in./24hr

2.11.3 Slip Sheet Under Metal Roof System

Slip sheet for use under metal roof system shall be a 5 lb. per 100 square feet rosin-sized, unsaturated building paper.

2.12 RUBBERIZED UNDERLAYMENT

Cold applied composite sheet consisting of rubberized asphalt and cross-laminated high density polyethylene film intended for use as underlayment for metal roof and wall panels. Not less than 40 mils minimum thickness is required.

2.12.1 Rubberized Underlayment Sheeting Performance Requirements

a. Tensile Strength, ASTM D 412, Die C: 250 psi minimum;
b. Ultimate Elongation, ASTM D 412, Die C: 200 percent mnimum;
c. Water Vapor Transmission, ASTM E 96: 0.05 perm maximum;
d. Low Temperature Flexibility, ASTM D 1970: Unaffected at -20 degrees F;
f. Adhesion to Plywood, ASTM D 903: 3 pounds per inch width.

2.13 Plywood Sheathing

Plywood shall conform to PS1, APA E445R or PS2, Grade C-D or sheathing grade with exterior glue. Sheathing for roof without corner shall have a span rating of 24/0 or greater for supports 24 inches on center.

2.14 SNOW GUARDS

Snow guards shall be the standard product of a manufacturer who has been in the practice of manuacturing snow guard systems for a period of not less than 3 years. The system shall consist of a 12 gauge stainless steel clamp which holds a 16 gauge 1 inch by 1 inch galvanized steel tube painted to match the roof. Clamps shall be designed to attach to the standing seams with stainless steel screws. Clamps shall not restrict the movement of the panels and shall be installed to specified torque. Provide ice-stopper

shapes designed to hang from the bar in the center of the panel.

2.15 EPDM RUBBER BOOTS

Flashing devices around pipe penetrations shall be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material shall be as recommended by the manufacturer. The boots shall have base rings made of aluminum or corrosion resisting steel that conform to the contours of the roof panel to form a weather-tight seal.

PART 3 EXECUTION

3.1 INSTALLATION

Structural steel deck surface must be completely dry before installation of roofing materials. No water or snow can remain in the deck flutes. Seal deck flutes at the edge of each day's work to prevent water from flowing under the completed roof. Install only as much roofing as can be fully completed through the metal roof system on a daily basis. Installation of the structural standing seam metal roof system shall be in accordance with the manufacturer's erection instructions and drawings. Dissimilar materials which are not compatible when contacting each other shall be insulated by means of gaskets or insulating compounds. Screws shall be installed with a clutching screw gun, to assure screws are not stripped. Field test shall be conducted on each gun prior to starting installation and periodically thereafter to assure it is adjusted properly to install particular type and size of screw as recommended by manufacturer's literature. Improper or mislocated drill holes shall be plugged with an oversize screw fastener and gasketed washer; however, sheets with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces and edges shall be kept clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Stained, discolored, or damaged sheets shall be removed from the site.

3.1.1 Field Forming of Panels for Unique Area

When roofing panels are formed from factory-color-finished steel coils at the project site, the same care and quality control measures that are taken in shop forming of roofing panels shall be observed. Rollformer shall be operated by the metal roofing manufacturer's representative. In cold weather conditions, preheating of the steel coils to be field formed shall be performed as necessary just prior to the rolling operations.

3.1.2 Subpurlins

Unless otherwise shown, subpurlins shall be anchored to the purlins or other structural framing members with bolts or screws. The subpurlin spacing shall not exceed 30 inches on centers at the corner, edge and ridge zones, and 5 foot maximum on centers for the remainder of the roof at areas west of Gridline 'C' and 2 foot maximum on centers for roof areas east of Gridline 'C'. Corner, edge, and ridge zones are as defined in ASCE 7. Provide neoprene washers at subpurlin screw attachments east of Gridline 'D'.

3.1.3 Roof Panel Installation

Roof panels shall be installed with the standing seams in the direction of the roof slope. The side seam connections for installed panels shall be completed at the end of each day's work. Method of applying joint sealant

shall conform to the manufacturer's recommendation to achieve a complete weather-tight installation. End laps of panels shall be provided in accordance with the manufacturer's instructions. Closures, flashings, EPDM rubber boots, roof curbs, and related accessories shall be installed according to the manufacturer's drawings. Fasteners shall not puncture roofing sheets except as provided for in the manufacturer's instructions for erection and installation. Expansion joints for the standing seam roof system shall be installed at locations indicated on the contract drawings and other locations indicated on the manufacturer's drawings. All cut edges are to be field coated with zinc-rich paint. Install approved temporary seal-off at the termination of each day's work and prior to precipitation. Roofing must be kept watertight on a daily basis.

3.1.4 Concealed Anchor Clips

Concealed anchor clips shall be fastened directly to the structural framing members. The maximum distance, parallel to the seams, between clips shall be 30 inches on center at the corner, edge, and ridge zones, and 5 feet maximum on centers for the remainder of the roof west of Gridline 'C' and two foot maximum on center for roof areas east of Gridline 'C'.

3.1.5 Plywood Sheathing Panels at SSSMR Type 3

Sheathing shall be applied with edges 1/8 inch apart at side and end joints, and fastened at supported edges at 6 inches on center and at intermediate supports 12 inches on center unless otherwise shown. Fastening of edges shall be 3/8 inch from the edges.

3.2 INSULATION INSTALLATION

Insulation shall be continuous over entire roof surface. Where expansion joints, terminations, and other connections are made, the cavity shall be filled with batt insulation with vapor retarder providing equivalent R-value and perm rating as remaining insulation. Insulation shall be installed as indicated and in accordance with manufacturer's instructions.

3.2.1 Board Insulation with Blanket Insulation

Rigid or semirigid board insulation shall be laid in close contact. Joints and gaps of 1/4 inch or more shall be filled with matching insulation. At roof areas west of Gridline 'D' board shall be attached to the metal roof deck with bearing plates and fasteners, as recommended by the insulation manufacturer, so that the insulation joints are held tight against each other, and shall have a minimum of 1 fastener per 4 square feet. At roof areas east of Gridline 'D', tightly secure insulation with retainer straps two foot on center maximum. Fasten straps to the side faces of the subpurlins with self-taping screws. Layout and joint pattern of insulation and fasteners shall be indicated on the shop drawings. If more than one layer of insulation is required, joints in the second layer shall be offset from joints in the first layer a minimum of 25% of the board dimension. A layer of blanket insulation shall be placed over the rigid or semirigid board insulation to be compressed against the underside of the metal roofing to reduce thermal bridging, dampen noise, and prevent roofing flutter. This layer of blanket insulation shall be compressed a minimum of 50 percent.

3.3 VAPOR RETARDER INSTALLATION

The moisture vapor control system shall be installed according to the Shop

Drawings. All installing staff shall be made awarae of the special needs of this system. None of the other roofing components shall be installed until specific supervisory approval has been made regarding the installed moisture vapor control components.

3.3.1 Reinforced Vapor Barrier

The reinforced vapor barrier membrane shall be installed over the rubberized underlaymenet at areas shown on the drawings. A fully compatible double sided asphaltic pressure sensitive mastic tape shall be used to seal the edges of the sheets and at plumbing vent penetrations to provide a vapor tight membrane. Sheet edges shall be lapped not less than 6 inches. Sufficient material shall be provided to avoid inducing stresses in the sheets due to stretching or binding. All tears or punctures that are visible in the finished surface at any time during the construction process shall be sealed with polyethylene tape. Provide an additional layer of double sided asphaltic pressure sensitive mastic tape on top of the reinforced vapor barrier at subpurlin locations.

3.4 RUBBERIZED UNDERLAYMENT

All side laps shall be minimum 3-1/2 inches and end laps shall be 6 inches. Laps shall be self adhesive mastic as per manufacturer's recommendation. Roll or firmly press to adhere membrane to substrate. Roll laps to provide a complete bond. Flash projections with a second ply of membrane for a distance of 6 inches from the projection. Finish exposed, terminated edges of membrane on sloped or vertical surfaces with a trowelled bead of mastic. Apply mastic around edges of membrane and projections. Apply mastic at end of each work day. Install membrane where indicated on drawings. Follow manufacturer's recommendations for installation below 40 degrees F.

3.5 GLASS MATT GYPSUM ROOF BOARD

The glass mat gypsum roof board sheathing shall be mechanically fastened to the roof deck as per manufacturer's recommendations. Use maximum lengths possible to minimize the amount of joints. Support parallel edge joints with deck ribs. Stagger end joint locations. Install wood blocking in roof deck voids at subpurlin locations.

3.6 SLIP SHEET INSTALLATION

A slip sheet shall be laid over the blanket insulation facing at SSSMR Type 1 and Type 2 and over rubberized underlayment at SSSMR Type 3 to prevent the vinyl facing from adhering to the metal roofing.

3.7 CLEANING AND TOUCH-UP

Exposed SSSMR systems shall be cleaned at completion of installation. Debris that could cause discoloration and harm to the panels, flashings, closures and other accessories shall be removed. Grease and oil films, excess sealants, and handling marks shall be removed and the work shall be scrubbed clean. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks. Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same material used for the shop coat. Factory color finished surfaces shall be touched up with the manufacturer's recommended touch up paint.

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

FACILITY DESCRIPTION_____

BUILDING NUMBER:_____

CORPS OF ENGINEERS CONTRACT NUMBER:_____

GENERAL CONTRACTOR

CONTRACTOR:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

SSSMR CONTRACTOR

CONTRACTOR:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

OWNER

OWNER:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

CONSTRUCTION AGENT

CONSTRUCTION AGENT:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
(continued)

THE SSSMR SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY _____(General Contractor), and _____(SSSMR Contractor) FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE. THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING: THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH ASTM E 1592. IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS, SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; EAVES, RIDGE, HIP, VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHINGS INSTALLED AND ANY OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS THAT ARE PART OF THE SSSMR SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE ASSOCIATED WITH THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _____ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

_____(General Contractor)
SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____
(Company President) (Date)

_____(SSSMR Contractor)
SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____
(Company President) (Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
(continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE SSSMR SYSTEM, WHICH SHALL BE SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.

5. FAILURE OF ANY PART OF THE SSSMR SYSTEM DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE. CONTRACTOR'S DESIGN SHALL INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW PONDING WATER.

6. THIS WARRANTY APPLIES TO THE SSSMR SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

**

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
(continued)

**REPORTS OF LEAKS AND SSSMR SYSTEM DEFICIENCIES SHALL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE SSSMR SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES SHALL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY SHALL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 08 - DOORS AND WINDOWS

SECTION 08350

MANUAL FOUR-FOLD DOORS

-- End of Section Table of Contents --

SECTION 08350

MANUAL FOUR-FOLD DOORS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 36	(1992) Structural Steel
ASTM A 48	(1994ae1) Gray Iron Castings
ASTM A 500	(2001a) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 513	(2000) Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM A 569	(1972) Steel Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip, Commercial Quality
ASTM C 920	(2002) Elastomeric Joint Sealants
ASTM E 283	(1991; R 1999) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PS 12.01	(2002) One-Coat Zinc-Rich Painting System
SSPC SP 6	(2000) Commercial Blast Cleaning

1.2 ACOUSTICAL PERFORMANCE

Installed door assembly including frames, hardware and perimeter and field seals and gasketing required to meet an acoustical performance level of STC 45.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Doors; G-AE

Weatherseals; G-AE

Show types, sizes, locations, metal gauges including minimum metal decimal thickness hardware locations and provisions, including reinforcing for installation, installation details, including weld locations and lengths, sealant application locations, and other details of construction for manually operated doors.

SD-03 Product Data

Doors; G-AE

Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of Manual Four-Fold Door.

Acoustical Performance; G-AE

Submit manufacturer factory calculations for STC requirements.

Seal Performance; G-AE

Submit test reports by an independent testing laboratory that the manual four fold door assembly has been designed and manufactured by the door manufacturer and has been tested for and comply with air infiltation in accordance with ASTM E 283 test methods.

SD-05 Design Data

Calculations for Door Member Sizing; G-AE

Submit structural calculations by a licensed professional engineer demonstrating that all structural steel members used in construction of the door assemblies are adequate to meet specified design load criteria. Size members using the longest vertical member.

SD-07 Certificates

Manufacturer's Certificate; G-AE

Door manufacturer to submit signed certificate by an officer of the company stating that door assemblies comply with all requirements of the contract documents.

SD-08 Manufacturer's Instructions

Doors; G-AO

Door shall be complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.

SD-10 Operation and Maintenance Data

Doors; G-AO

Submit operating instructions, maintenance information, and instructions in accordance with Section 01781 OPERATIONS AND MAINTENANCE DATA.

1.4 DELIVERY, STORAGE, AND HANDLING

Protect doors and accessories from damage during delivery, storage, and handling. Clearly mark manufacturer's brand name. Store doors in dry locations with adequate ventilation, free from dust and water. Storage shall permit easy access for inspection and handling. Remove damaged items and provide new.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Steel Tubing, Electric Welded

ASTM A 513.

2.1.2 Steel Tubing, Structural Welded

ASTM A 500 Grade B.

2.1.3 Structural Shapes and Plates

ASTM A 36 Steel Plate Channels and Angles.

2.1.4 Casting, Cast Iron

ASTM A 48.

2.1.5 Face Sheets

ASTM A 569, Steel Sheet Metal, Hot Rolled, 14-Gauge Minimum.

2.1.6 Interior and Exterior Finish

Paint finish. Method of preparation is described in Part 3. See Section 09915 COLOR SCHEDULE for finish color.

2.2 DOORS

Doors shall be a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.

2.3 DESIGN REQUIREMENTS

Design door to limit deflection to not more than L/120 of their span under

a minimum windload of 90 mph, exposure C. Door components shall be designed in accordance with AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, and AISI Specification for the Design of Cold Formed Steel Structural Members. Manufacturer's Certificate shall state compliance with these requirements.

2.4 FABRICATION

2.4.1 Door Panel Frames

Door panel frames (leaves) shall have horizontal and vertical structural framing and shall be constructed of standard steel, square steel tubing, or rectangular steel tubing section of ample size and strength for loads and stresses imposed under the specified conditions. Provide calculations for door member sizing. Interior door panel frame members shall run horizontally at no more than 2 feet 0 inches on center and shall be of welded construction and all joints shall develop the full strength of the framing members. Door panel frame members shall be true and square in all directions. Door panel frames shall be sheeted on interior and exterior sides with 14 gauge flat hot rolled steel. All perimeter welds on door sheeting shall be not less than 1-1/2 inches in length and spaced not more than 9 inches on center. Welds to intermediate members shall be 3/8 inch diameter, plug welds not more than 9 inches on center.All exposed seams of the door panel sheeting shall be sealed with an ASTM C 920 complying sealant after fabrication and prior to prime painting. Door panels shall not be bowed, warped, or out of line by more than 1/8 inch in 20 feet. Exposed welds and weld that interfere with the installation of various arts shall be ground smooth. All welding to be per AWS D1.1

2.4.1.1 Insulated Sections

Door sections shall be insulated with 3-1/2 inches thick polyisocyanurate rigid board, insulation providing an R-value of approximately 18.9 or less. The insulating material shall be fitted to cover the entire surface of the door panel between the structural members. Fill voids with compatible spray foam in void filling insulation material.

2.4.2 Hardware

Provide necessary hardware required for complete insulation. Hardware shall be heavy-duty type including all bolts, and fittings for the hardware.

2.4.2.1 Door Glides

The door guides shall be steel "S" beams S4 x 7.7 minimum. Include wall support brackets. Guides shall be capable of being mounted within 10 inches headroom.

2.4.2.2 Guide Roller Assemblies

The door shall have a minimum of two anti-friction guide roller assemblies. The guide roller assemblies shall be of sufficient size to transmit the windload from the door panels to the steel door guides. Provide two (2) 3 inch diameter minimum rollers in each assembly with bearings and grease zerk fittings to take vertical load and four (4) 1 inch diameter minimum steel rollers, which take the horizontal load.

2.4.2.3 Jamb Hinges

Door shall be complete with shop applied strap type jamb hinges. Jamb hinges to be constructed from 3 inches x 3/8 inch bar minimum. Jamb hinge barrel seams must be welded. Jamb hinges shall be gusseted with steel bars along both edges. Each hinge shall be supported on roller bearings. Hinges shall be through bolted on panel. Grease zerk fittings shall be provided on all hinges for greasing hinge pintles.

2.4.2.4 Hinge Pintles

Jamb hinges shall have continuous 7/8 inch diameter steel pintles the full height of the opening. Fold hinges shall have minimum 7/8 inches diameter steel pintles the height of the hinge assembly.

2.4.2.5 Fold Hinges

Door shall be complete with mortised hinges. Mortised fold hinges to be constructed from 3/8 inch steel plate or bar. Fold hinge barrel seam must be welded. Fold hinges shall be of dual capture design and have no less than two (2) shear planes. Fold hinges shall be equipped with a 7/8 inch diameter hinge pin with grease chase and grease zerk for lubrication. All fold hinges shall be equipped with two (2) roller bearings,

2.4.2.6 Cane Bolts

Provide heavy-duty type floor level 1 inch diameter cane bolts to hold the door in the closed position. Provide one(1) cane bolt for each door leaf.

2.4.2.7 Chain Pulls

Provide heavy-duty type chain pull bolts at top of door panels to hold the door in the closed position. Provide one (1) chain pull per door leaf.

2.4.2.8 Door Pulls

Provide two (2) heavy duty door pulls total, with one (1) per opening pair. Mount on interior side of door leaves near meeting jamb. Attach to door frame structure using no thru fastening.

2.4.2.9 Thresholds

Provide 1/2 inch thick by 8 inch wide by door width opening, thermally broken, mill finish aluminum threshold conforming to ANSI J32190 - 8 inch width, saddle threshold, fluted surface, thermal barrier.

2.5 WEATHERSEALS

Provide impregnated dual durometer bulb type weather-seal at the jambs, sill and head, cloth inserted rubber sweep at sill, combination reversing edge and rubber seal at meeting edges, and sponge and metal astragal between door sections. Manufacturer shall provide test reports of a factory test similar door system for air leakage per ASTM E 283 Test with test results verified by an independent testing laboratory. Seal performance in air leakage test shall not exceed .78 cubic feet per minute per square foot of door opening under a 25 mph windload.

2.6 FINISHES

Thoroughly clean, pre-treat and prime surfaces of door assembly including fixed panels, trims, support and closure pieces.

2.6.1 Pre-Treatment

Pre-treat with primer as required by manufacturer. Surface preparation on carbon steel surfaces shall be SSPC SP 6 commercial sand blast.

2.6.2 Primer

Where required, steel surfaces shall be shop painted with one coat of zinc rich primer conforming to SSPC PS 12.01. Surface preparation on carbon steel surfaces shall be SSPC SP 6 commercial sand blast.

2.6.3 Painting

Finish painting by others is specified in Section 09900 PAINTS AND COATINGS for systems and color selection in Section 09915 COLOR SCHEDULE.

PART 3 EXECUTION

3.1 INSTALLATION

Install doors in accordance with approved shop drawings and manufacturers instructions. Upon completion, doors shall be weathertight and free from warp, twist, or distortion. Lubricate and adjust doors to operate freely. The installation of the doors shall be by a factory trained and certified installer of the door manufacturer or supervised by an authorized representative of the door manufacturer.

3.1.1 Threshold Installation

Extend thresholds for full width of the opening. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws in expansion sleeves.

3.2 OPERATION AND MAINTENANCE

After installation is complete, provide two (2) copies minimum of a printed and bound manual of operation providing detailed information for maintenance and adjustments. Install gate and operating equipment with necessary hardware, and equipment in accordance with final Shop Drawings, Manufacturer's instructions, and as specified herein. Instruct and observe Owner's maintenance staff representative through a minimum of two complete cycles of opening and closing doors using all the functions of operating hardware.

-- End of Section --